

CLAIMS

1. A method of increasing an immune response to an opportunistic infection in an immunocompromised subject, comprising administering to the subject a therapeutically effective amount of an immunostimulatory D oligodeoxynucleotide or an immunostimulatory K oligodeoxynucleotide, thereby increasing the response to the opportunistic infection.
2. The method of claim 1, wherein the subject is immunocompromised as a result of an infection with a lentivirus, and wherein the method comprises administering a therapeutically effective amount of an immunostimulatory D oligodeoxynucleotide to the subject.
3. The method of claim 2, wherein the lentivirus is a human immunodeficiency virus or a simian immunodeficiency virus.
4. The method of claim 2, wherein the lentivirus is HIV-1.
5. The method of claim 2, wherein the lentivirus is HIV-2.
6. The method of claim 1, wherein the subject has acquired immune deficiency syndrome (AIDS).
7. The method of claim 1, wherein the oligodeoxynucleotide is at least about 16 nucleotides in length and comprises a sequence represented by the following formula:
- $$5' X_1 X_2 X_3 Pu_1 Py_2 CpG Pu_3 Py_4 X_4 X_5 X_6 (W)_M (G)_N - 3' \text{ (SEQ ID NOs: 22-98)}$$
- wherein the central CpG motif is unmethylated, Pu is a purine nucleotide, Py is a pyrimidine nucleotide, X and W are any nucleotide, M is any integer from 0 to 10, and N is any integer from 4 to 10.

8. The method of claim 7, wherein N is about 6.
9. The method of claim 7, wherein Pu Py CpG_Pu Py comprises phosphodiester bases.
- 5 10. The method of claim 7, wherein Pu₁ Py₂ CpG Pu₃ Py₄ are phosphodiester bases.
- 10 11. The method of claim 7, wherein X₁X₂X₃ and X₄X₅X₆(W)_M(G)_N comprise phosphodiester bases.
12. The method of claim 7, wherein X₁X₂X₃ comprises one or more phosphothioate bases.
- 15 13. The method of claim 7, wherein X₄X₅X₆(W)_M(G)_N comprises one or more phosphothioate bases.
14. The method of claim 7, wherein X₁X₂X₃ Pu Py and Pu Py X₄X₅X₆ are self complementary.
- 20 15. The method of claim 7, wherein the opportunistic infection is a bacterial infection, a fungal infection, a viral infection, a protozoan infection, a prion disease, or a neoplasm.
- 25 16. The method of claim 7, wherein the opportunistic infection is infection with *Leishmania*.
17. The method of claim 7, wherein the opportunistic infection is salmonellosis, syphilis, neurosyphilis, tuberculosis, atypical mycobacterial infection, bacillary

angiomatosis, aspergillosis, candidiasis, coccidioidomycosis, cryptococcal meningitis, hepatitis B, histoplasmosis, cryptosporidiosis, isosporiasis, microsporidiosis, *Pneumocystis Carinii* pneumonia, toxoplasmosis, *Cytomegalovirus*, hepatitis, herpes simplex, herpes zoster, human papiloma virus, *Molluscum Contagiosum*, oral hairy
5 leukoplakia, progressive multifocal leukoencephalopathy, Kaposi's sarcoma, systemic non-Hodgkin's lymphoma, or primary CNS lymphoma.

18. The method of claim 2, further comprising administering to the subject a combination of drugs which comprises a highly active anti-retroviral therapy (HAART).

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19. The method of claim 2, further comprising administering an anti-retroviral drug.

20. The method of claim 2, wherein the anti-retroviral retroviral drug comprises
15 3'-azido-3'dexoy-thymidine (AZT).

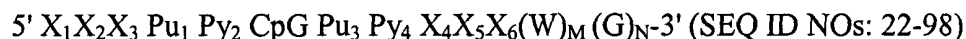
21. The method of claim 1, wherein the oligodeoxynucleotide comprises a sequence selected from the group consisting of SEQ ID NO: 1, SEQ ID NO: 2, SEQ ID NO: 3, SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7, SEQ ID NO: 8,
20 SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11, SEQ ID NO: 12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15, and SEQ ID NO: 16.

22. The method of claim 1, wherein the oligodeoxynucleotide is a K oligonucleotide that comprises a sequence represented by the formula:

25 5'-N₁N₂N₃T-CpG-WN₄N₅N₆-3' (SEQ ID NO: 20)

wherein the central CpG motif is unmethylated, W is A or T, and N₁, N₂, N₃, N₄, N₅, and N₆ are any nucleotides.

23. Use of an oligodeoxynucleotide of least about 16 nucleotides in length and comprises a sequence represented by the following formula:



wherein the central CpG motif is unmethylated, Pu is a purine nucleotide, Py is a pyrimidine nucleotide, X and W are any nucleotide, M is any integer from 0 to 10, and N is any integer from 4 to 10, and an antigen of an immunodeficiency virus for the treatment of an immunodeficiency virus infection.

24. A method of increasing an immune response to an opportunistic infection in an immunocompromised subject, comprising administering to the subject a therapeutically effective amount of an immunostimulatory D oligodeoxynucleotide, thereby increasing the response to the opportunistic infection.

25. A method of increasing an immune response to an opportunistic infection in an immunocompromised subject, comprising administering to the subject a therapeutically effective amount of an immunostimulatory D oligodeoxynucleotide or an immunostimulatory K oligodeoxynucleotide, wherein an antigenic epitope of a polypeptide is not administered to the subject, thereby increasing the response to the opportunistic infection.